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Original Research Paper

Dentistry

ANEMIA AND ORAL HEALTH

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KEYWORDS :

INTRODUCTION

Oral health is the state of the mouth, teeth and orofacial structures that enables individuals to perform essential functions such as eating, breathing and speaking, and encompasses psychosocial dimensions such as self-confidence, well-being and the ability to socialize and work without pain, discomfort and embarrassment. Oral health varies over the life course from early life to old age, is integral to general health and supports individuals in participating in society and achieving their potential. The WHO Global Oral Health Status Report (2022) estimated that oral diseases affect close to 3.5 billion people worldwide, with 3 out of 4 people affected living in middle-income countries. Globally, an estimated 2 billion people suffer from caries of permanent teeth and 514 million children suffer from caries of primary teeth.[1]

Approximately one third of the 5.5 billion people in the world are anaemic. Worldwide, approximately 40% of children (0–12 years), 35% of all women, 51% of pregnant women, and 18% of men are anaemic. These figures are probably conservative estimates because the diagnosis of anaemia is based on the World Health Organization definition of anaemia: haemoglobin less than 11 g/dL for children aged 0 to 4 years and pregnant women, haemoglobin less than 12 g/dL for children aged 5 to 12 years and nonpregnant women, and haemoglobin less than 13 g/dL for men.[2]

How Anaemia Affects The Oral Health:

When teeth, gums, and other oral tissues do not receive nutrients carried by the blood, they become weak and cannot fight against microbial invasions. This is the root cause of various oral complications.

However, anaemia is classified into various types based on triggering factors like iron deficiency, viral infections, etc. Remember that each type of anaemia has its kind of attack on your oral health. It is listed as follows:

1) Iron Deficiency Anaemia – It is the most common type of anaemia and it happens when your body does not have a sufficient amount of iron which is essential to make haemoglobin. People suffering from iron deficiency anaemia have **swelling, soreness, and paleness in their tongues**. Likewise, they are at high risk of developing **gum diseases**. IDA prevalence is notably high among pregnant women and young children. IDA and early-childhood caries (ECC) disproportionately affect impoverished populations, highlighting the socioeconomic dimension of this issue. IDA presents with various oral mucosal changes and is closely linked to candidiasis. Additionally, IDA can hinder tooth development and weaken the immune response. Children with iron deficiency (ID) or iron deficiency anaemia (IDA) were associated with dental caries in childhood. Some studies have also shown that children with caries have lower serum ferritin, haemoglobin (HGB), and mean corpuscular volume (MCV) levels than caries-free children. A mutual relationship between ID and ECC was found, which suggests that many children diagnosed with ECC may have inflammation and necrosis in the pulp of their primary teeth, and the agony and discomfort could change their chewing habits, resulting in decreases in meat intake and fruit frequency, affecting the intake and supplementation of iron. This can lead to nutritional IDA.[3]

2) Vitamin Deficiency Anaemia – Inadequate number of Vitamins B12, C, or folate in our body also affects the body's ability to produce enough red blood cells. This condition is called vitamin deficiency anaemia. As vitamin deficiency and insufficient nutrient intake are now combined, it is quite hard on the oral tissues by causing **mouth ulcers, painful tongue, affecting the tongue's papilla where taste buds are located.** Vitamin B_{12} is one of important nutritional components that affect oral health. Individuals with decreased levels of vitamin B_{12} have been reported to exhibit various oral manifestations such as glossitis, glossodynia, recurrent ulcers, cheilitis, dysgeusia, lingual paresthesia, burning sensations, and pruritus.[4]

3) Sickle Cell Anaemia – When the red blood cells are atypically shaped, they cannot travel through the blood vessels. In simply, the organs cannot get oxygen-rich blood due to the differently shaped red blood cells. Common oral manifestations have been described in SCD patients, including lower salivary flow increased levels of biofilm, hypo mineralization of the enamel and dental caries. In addition, frequent admission, drug treatments, and diminished oral hygiene are high-risk factors for caries, which contribute to more dental caries in SCD patients. Dental caries can destroy hard tissues of the teeth and may lead to pulpitis and periapical periodontitis, which can even become a source of infection in sickle cell crisis due to an insufficient blood supply.[5]

4) Aplastic Anaemia – Aplastic anaemia is a rare haematological disorder characterized by the failure of hematopoietic precursor cells in the bone marrow to produce erythrocytes, granulocytes, and platelets, resulting in pancytopenia.The incidence of aplastic anaemia is reported to be about two cases per million annually. The initial

symptoms of aplastic anaemia are due to the deficiency of either one or several formed elements of the blood. The deficiency of red blood cells results in reduced oxygen-carrying capacity of the blood. As a result, patients may experience severe weakness with dyspnoea, fatigue, light headedness, and tachycardia. Petechiae, purpuric spots, bruising, and hematomas are seen as the effect of platelet deficiency which, at times, has been associated with serious conditions such as retinal and cerebral haemorrhages.

Oral findings in aplastic anaemia include gingival haemorrhage, mucosal petechiae, purpura, and ecchymoses due to thrombocytopenia. Erythropenia causes pallor of the oral mucosa. Ulcerative lesions, especially of the gingiva, may develop in association with secondary infection. These ulcers may have an erythematous margin. Gingival hyperplasia, swelling, and submucosal haemorrhage also may be present. Oral hygiene maintenance of these patients may be impaired because of their reluctance to brush their teeth for fear of increased gingival bleeding. This may predispose them to generalized gingival inflammation, which may progress to periodontitis.[6]

5) Fanconi Anaemia – Fanconi's anaemia (FA) is a rare autosomal recessive disorder characterized by multiple congenital abnormalities, bone marrow failure, and susceptibility to malignancies, especially leukaemia, solid tumours such as liver tumours and squamous cell carcinoma of mucous areas.

There are a few reports about oral manifestations of FA.

Schofield and Abbot (1978) described a case of a woman with microcephaly, extreme gingival inflammation and recession.

Joho and Marechaux (1979) described a case of a woman with macroglossia and generalized microdontia with enamel hypoplasia, which may be caused by FA.

Schofield and Worth (1980) reported a case of a lady with severe generalized periodontitis, gingival inflammation and recession associated with bad hematologic condition. The patient also had ulceration on her tongue diagnosed as an invasive squamous cell carcinoma.

Opinya et al (1988) presented a case of a 24-year-old male patient with black hyperpigmentation on the oral mucosa and palate, generalized gingival inflammation, bleeding on probing and poor oral hygiene. The right third molar showed a crown deformed and smaller than the normal size.

Lau et al (1988) reported a case of a boy with hypoplasia, large enamel opacities, and hypodontia.[7]

6) Thalassemia - Thalassemia is an autosomal recessive blood disorder that causes alteration in haemoglobin synthesis manifesting in variable degrees of anaemia that ranges from clinical alterations those threatening to life. Major changes seen in the facial region in thalassemia patients include the prominence of zygomatic bones and maxillary enlargement due to erythroid hyperplasia that is accompanied by depression of the nasal bridge. All of these changes may cause characteristic facial appearance referred to as "Chipmunk or Rodent facies. The most common oro-facial manifestation in -thalassemia major (BTM) includes prominent frontal bossing and zygomatic arches, overgrowth of the maxillary bone, dental, and skeletal malocclusion along with delay in the development of teeth. Other dental as well as facial defects include spacing between the teeth, forward drifting of maxillary incisors, anteriorly located open bite, protruding maxilla, malocclusions, and saddled nose. - Thalassemia patients are at a higher risk of developing dental caries as well as periodontal diseases.[8]

CONCLUSION

Anaemia, encompassing various forms such as iron deficiency, vitamin B12 deficiency, sickle cell anaemia, thalassemia, and others, significantly influences oral health by impairing the function and resilience of oral tissues. Insufficient blood supply and nutrient deficiencies result in a range of oral manifestations, including mucosal pallor, glossitis, gingival haemorrhage, increased susceptibility to infections, delayed tooth development, and heightened risk for dental caries and periodontal diseases. Each type of anaemia affects the oral cavity differently, with conditions such as iron deficiency anaemia and sickle cell anaemia increasing the risk of gum disease and dental decay, while thalassemia and aplastic anaemia lead to distinct facial and oral skeletal abnormalities. The association between anaemia and oral health highlights the importance of early detection and comprehensive care, including both haematological and dental interventions, to prevent and manage oral complications in anaemic patients. Effective oral hygiene, nutritional support, and regular dental monitoring are essential to mitigate the oral manifestations and improve overall health outcomes in individuals with anaemia.

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